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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,021	01/28/2004	Sunay Tripathi	20910/0206138-US0	4731
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Sun Microsystems, Inc. c/o DARBY & DARBY P.C. P.O. BOX 770 Church Street Station NEW YORK, NY 10008-0770			EXAMINER PARK, JEONG S	
			ART UNIT 2154	PAPER NUMBER
			MAIL DATE 09/11/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/767,021	<b>Applicant(s)</b> TRIPATHI ET AL.	
	<b>Examiner</b> JEONG S. PARK	<b>Art Unit</b> 2154	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 May 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 28-31,33-42 and 44-50 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 28-31,33-42 and 44-50 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. This communication is in response to Application No. 10/767,021 filed on 28 January 2004. The amendment presented on 22 May 2008, which cancels claims 32 and 43, and provides change to claims 28-31, 33-42 and 44-50, is hereby acknowledged. Claims 28-31, 33-42 and 44-50 have been examined.

#### ***Claim Objections***

2. Claim 36 and 37 are objected to because of the following informalities:

In claim 36, line 2, the phrase "the packet" should be corrected as --the data packet-- for clear understanding of the claim.

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 28-31, 33-42 and 44-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buch et al. (hereinafter Buch)(U.S. Patent No. 7,114,011 B2) in view of Fineberg (U.S. Pub. No. 2004/0252709 A1).

Regarding claims 28 and 39, Buch teaches as follows:

a method of providing services of an application (one application area for servers is provide streaming data over the Internet, see, e.g., col. 1, lines 14-22) comprising:

providing a plurality of network interfaces (NIC1 to NIC3 in figure 2, see, e.g., col.

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4, lines 5-18);

providing a plurality of CPU's (CPU1 to CPU3 in figure 2, see, e.g., col. 1, lines 14-22);

running an instance of the application for each one of the plurality of network interfaces (data from the input buffer is copied to the output buffer in order to send the requested data to the clients via a network interface card 350 in figure 3, see, e.g., col. 4, lines 19-26);

designating a separate one of said plurality of CPU's to each instance (server threads are bound to specific processors, see, e.g., col. 3, lines 40-50);

binding a separate one of said plurality of network interfaces to each CPU, whereby each network interface is handled solely by the CPU to which that network interface is bound (processors are bound to respective network interface cards, see, e.g., col. 4, lines 5-18);

providing a processing queue (output buffer in figure 3) for each of the plurality of CPU's (output buffer between CPU 300 and NIC 350, see, e.g., col. 4, lines 19-26 and figure 3); and

assigning a separate one of the processing queues to each one of the plurality of CPUs, wherein the processing queue assigned to a particular CPU provides single threaded processing of data related to an instance of the application (buffers corresponding to a thread are processed only by the processor to which the thread is bound, see, e.g., col. 3, lines 40-50).

Buch does not teach the separate instance of the application for each one of the plurality of network interface which binding with only the CPU designated to the separate instance of the respective network interface.

Fineberg teaches as follows:

a server (104 in figure 1) includes multiple storage devices, multiple NICs (107 in figure 1), multiple processors (108 in figure 1, equivalent's to applicant's plurality of CPU's) and multiple disk controllers and the server implements "pipelining" in which multiple client requests are processed concurrently (see, e.g., page 2, paragraph [0019], lines 1-7);

the server includes a thread (equivalent to applicant's instance of the application, see, e.g., page 2, paragraph [0020]) for each send/receive queue (equivalent to applicant's processing queue) pair with a separate thread being allocated for each send/receive queue pair and the each thread may be statically allocated to the corresponding send/receive queue pair, which means that each send/receive queue pair has a predetermined thread dedicated for use for that queue pair (see, e.g., page 2, paragraph [0019]); and

the send/receive queues (120, 126 in figure 1 and 132 in figure 3, equivalent to applicant's processing queue) exists within the server's memory (114 in figure 1) or in memory on the NIC (107 in figure 1)(see, e.g., page 1, paragraph [0017]).

Therefore Fineberg teaches a separate instance of the application (interpreted as a thread) coupled to one each of plurality of NICs and CPU's.

It would have been obvious for one of ordinary skill in the art at the time of the invention to modify Buch to include multiple client requests or multiple threads processing with separate queue, NIC and CPU as taught by Fineberg in order to efficiently process multiple client requests concurrently.

Regarding claims 29, 30, 40 and 41, Buch teaches as follows:

one application area for servers is provide streaming data over the Internet (see, e.g., col. 1, lines 14-22); and

a UDP and IP headers for outgoing packets are prefixed to the data in the output buffer in the usual way (see, e.g., col. 4, lines 37-41).

Therefore it is inherent that the network interface cards are used in the Internet and inherently including IP address assigned.

Regarding claims 31 and 42, Buch teaches as follows:

on-demand content streams refers to the streaming of specific client requested data files (see, e.g., col. 1, lines 14-22), therefore the server only responds to requests from a specific client on the network; and

network interface cards are respectively dedicated to specific client connections to ensure tightly-coupled connection processing (see, e.g., col. 4, lines 5-18).

It would have been obvious for one of ordinary skill in the art at the time of the invention to modify Buch to include requesting data files process from a client via a dedicated network interface card even though this is inherent functionality of the on-demand content distribution system.

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Regarding claims 33 and 44, Buch teaches as follows:

each processing queue is a sequential queue (data processing on the input and output buffers is sequential, see, e.g., col. 4, lines 19-36).

Regarding claims 34 and 45, Buch teaches as follows:

each single threaded processing is uninterrupted while processing the data related to an instance of the application (interrupts for network interface card are bound to respective processor, see, e.g., col. 3, lines 25-33).

Regarding claims 35-37 and 46-48, Buch teaches as follows:

receiving data packets (network interface card NIC0 is reserved for input stream processing of data from the media encoder system 100 in figure 2, see, e.g., col. 4, lines 7-10);

routing the data packet to the determined processing queue (processing data from the input buffer to the output buffer and then transferred to the network interface card which is dedicated to specific client connection (see, e.g., col. 4, lines 5-26);

a UDP and IP headers for outgoing packets are prefixed to the data in the output buffer in the usual way (see, e.g., col. 4, lines 37-41); and

if the determined processing queue is busy, waiting before the step of processing the packet by the determined processing queue (output buffer is bound to each network interface card which is dedicated to specific client connections, see, e.g., col. 4, lines 5-18, therefore waiting for the dedicated output buffer space is inherent).

It would have been obvious for one of ordinary skill in the art at the time of the invention to modify Buch to include connection classifier information in the packet

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header even though the packet header inherently includes some information related with connections.

Regarding claims 38 and 49, Buch teaches as follows:

the step of running an instance of the application for each one of the plurality of network interfaces and the step of designating a separate one of said plurality of CPU's to each instance is performed automatically by an operating system (hardware interrupts from the NIC are routed to any available processor by the operating system, see, e.g., col. 1, lines 48-52).

Regarding claim 50, Buch teaches as follows:

a computer system comprising:

a plurality of instances of an application (on-demand content streams refers to the streaming of specific client requested data files, see, e.g., col. 1, lines 14-22, therefore there are a plurality of content requests from a plurality of clients);

a plurality of CPU's (CPU1 to CPU3 in figure 2, see, e.g., col. 1, lines 14-22), each CPU configured to process a separate one of said plurality of instances (the processors CPU1-CPU3 have their respective server threads, see, e.g., col. 4, lines 5-18);

a plurality of network interfaces (NIC1 to NIC3 in figure 2, see, e.g., col. 4, lines 5-18) for a plurality of network connections to said computer system (the network interfaces NIC1-NIC3 are respectively dedicated to specific client connections, see, e.g., col. 4, lines 5-18);



an operating system (hardware interrupts from the NIC are routed to any available processor by the operating system, see, e.g., col. 1, lines 48-52), wherein said operating system is configured to;

automatically designate a separate CPU for processing each separate one of said instances of said application (the processors CPU1-CPU3 have their respective server threads, see, e.g., col. 4, lines 5-18); and

automatically designate each of the plurality of network interfaces to one of the plurality of CPU's (processors are bound to respective network interface cards, see, e.g., col. 4, lines 5-18), thereby assigning each one of the network interfaces to an instance of said application (see, e.g., col. 4, lines 42-65).

Buch does not teach that each CPU having its own processing queue.

Fineberg teaches as follows:

a server (104 in figure 1) includes multiple storage devices, multiple NICs (107 in figure 1), multiple processors (108 in figure 1, equivalent's to applicant's plurality of CPU's) and multiple disk controllers and the server implements "pipelining" in which multiple client requests are processed concurrently (each NIC, memory and processor are designated for a client request, see, e.g., page 2, paragraph [0019], lines 1-7);

the server includes a thread (equivalent to applicant's instance of the application, see, e.g., page 2, paragraph [0020]) for each send/receive queue (equivalent to applicant's processing queue) pair with a separate thread being allocated for each send/receive queue pair and the each thread may be statically allocated to the corresponding send/receive queue pair, which means that each send/receive queue

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pair has a predetermined thread dedicated for use for that queue pair (see, e.g., page 2, paragraph [0019]); and

the send/receive queues (120, 126 in figure 1 and 132 in figure 3, equivalent to applicant's processing queue) exists within the server's memory (114 in figure 1, which located within ) or in memory on the NIC (107 in figure 1)(see, e.g., page 1, paragraph [0017]).

Therefore, each processor (108 in figure 1) having its own processing queue (send/receive queue) located in a memory on the NIC (107 in figure 1).

It would have been obvious for one of ordinary skill in the art at the time of the invention to modify Buch to include dedicating one send/receive queue to one processor for processing a separate thread as taught by Fineberg in order to efficiently process multiple client requests concurrently.

### ***Response to Arguments***

5. Applicant's arguments filed 22 May 2008, with respect to claim 28-31, 33-42 and 44-50 have been considered but are moot in view of the new ground(s) of rejection.

#### **A. Summary of Applicant's Arguments**

In the remarks, the applicant argues as followings:

1) Regarding claims 29-31 and 40-42, Buch does not teach that his NIC each has its own separate network address.

#### **B. Response to Arguments:**

In response to argument 1) the Network Interface Card (NIC) has its unique Medium Access Control (MAC) address and the each MAC address is assigned to IP

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address via the well known Address Resolution Protocol (ARP). Therefore, Buch's NIC also inherently has its own network address (IP address).

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEONG S. PARK whose telephone number is (571)270-1597. The examiner can normally be reached on Monday through Friday 7:00 - 3:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. S. P./  
Examiner, Art Unit 2154

September 8, 2008

/Joseph E. Avellino/  
Primary Examiner, Art Unit 2146